

dal distributions, and expresses the magnetic force at any external point, or at any internal point in an infinitely small crevass tangential to the lines of magnetization, as the resultant of a certain distribution of tangential magnetization in an infinitely thin shell, coinciding with the surface, and occurred to the author as the analogue of a method which he had long before found for expressing the force due to a lamellar distribution. In this last-mentioned method, which is confined to lamellar distributions, the force at any external point, or at any interior point in an infinitely small crevass perpendicular to the lines of magnetization, is expressed as the resultant of a certain distribution of normal magnetization in an infinitely thin shell coinciding with the surface.

9. "Les Causes du Magnétisme terrestre prouvées." Par M. Pierre Beron. Communicated by John Lee, Esq., LL.D., F.R.S. &c.

The author considers the elements of terrestrial magnetism to be, that the force with which the magnetic needle maintains its position is not everywhere the same, and that its declination and inclination vary from one region to another. These elements, he states, undergo very different modifications, which may be reduced to the following:—

1. Variations with reference to the position of the sun to the south or to the north of the equator; 2. diurnal variations in different regions of the earth; 3. disturbances which proceed from changes of weather, and from volcanic irruptions, and those which are observed during the appearance of the aurora borealis; 4. secular variations.

Adopting the views which have long since been put forward, but without adverting to the opinions of others who have preceded him in the same path, the author refers all the phenomena of terrestrial magnetism to the action of thermo-electric currents, and states, that as we know from climatology the regions of the earth which have the most hetero-thermal seasons, we have data for determining the intensity and direction of the thermo-electric currents in every region of the globe.

The hetero-thermal regions being marked by the isothermals of the most hetero-thermal months, the author distributes the thermo-electric currents into four magnetic systems, in each of which the currents are directed towards the middle, marked by the culmination of the isothermals. He then endeavours to trace out the general connexion between the thermo-electric currents which he assumes and the magnetic phenomena as observed in what he terms the American, the Asiatic, the Australian, and the Gallipagos' magnetic systems.

The extraordinary disturbances in the direction of the needle, he attributes to changes in the regular order of the distribution of solar heat, which give rise to corresponding changes in the thermo-electric currents; and the secular variation to the amelioration of climate arising from the culture of the soil in different regions of the earth.

The author concludes his memoir with the following remark:—

“Le magnétisme terrestre n'est donc que des courants thermo-électriques, et l'aiguille magnétique est un thermoscope qui nous indique les différences des températures des régions hétéro-thermes, dont nous connaissons les distances. Par suite le magnétisme terrestre fait une partie de la climatologie, qui exprime la cause de cette anormale distribution de la chaleur pendant chaque saison et pendant chaque mois. Cette cause se trouve,—1°, dans la conformation géographique de la surface de la terre; et 2°, dans les déplacements diurnes et annuels de notre planète.”

10. “On the Physiology and Pathology of Phosphate and Oxalate of Lime, and their relation to the formation of Cells.” By William Beneke, M.D. Communicated by Sir James Clark, Bart., F.R.S.

In this paper the author commences by referring to a work recently published by him, entitled “*Der Phosphoräsure Kalk in physiologischer und therapeutischer Beziehung*,” Göttingen, 1850, in which he believes that he has established the indispensable necessity of phosphate of lime to the formation of cells in man, as well as in animals and plants; its deficiency as a cause of disease; and its efficacy administered internally as a means of alleviation or cure in the treatment of such disease. He cites from Liebig various proofs of the necessity of the presence of phosphate of lime for the formation of nitrogenous compounds in plants; and from Carl Schmidt, that it has an intimate relation to the formation of cells in invertebrate animals; and argues from his own experiments, that it has the same relation to the formation of cells in the higher classes of animals and in man. These experiments consisted, first, in the chemical examination of various pathological exudations, such as the serum produced by blisters, the secretions of wounds, ulcers, &c., the result of which satisfied him, that, wherever a formation of cells took place, phosphate of lime was present in considerable quantity; and wherever it was absent, he could not detect any phosphate. He believes that from a mixture of albumen, pure fat and phosphate of lime, put in a sand-bath at 104°, he has succeeded in artificially producing cells, which he describes and figures in various stages. He further adduces, in proof of his theory, the beneficial results of the treatment of various diseases connected with dyscrasia, by the administration of phosphate of lime. In such diseases he states that a much larger quantity of the phosphates is removed from the œconomy by the urine than in the normal state; and this he determines by a multitude of observations conducted on a method of analysis proposed by Dr. Heinz of Berlin. This increased elimination of the phosphates he attributes to the presence of oxalic acid, the existence of which in the urine he regards as always indicative of disease. On this subject he refers to the works of Dr. Prout, Dr. Golding Bird and Dr. Bence Jones, and compares the results of his own observations with those of the authors cited, giving figures of the various forms of oxalate of lime, and diagrams of the diurnal variations of the acidity of the urine, of its specific gravity, and of the phosphates and oxalates of lime contained in it, in two remarkable cases. From